

Appl. No. 09/810,871
Amdt. dated February 8, 2006
Reply to Office Action of February 3, 2005

REMARKS/ARGUMENTS

Introduction:

Claims 36, 56, 58, 80, and 84 are amended. Claims 36-58 and 60-91 are now pending in the application. (Claims 1-35 and claim 59 were previously canceled.) Applicants respectfully request reexamination and reconsideration of the application in light of the following remarks.

Amendments Not Made For Purposes Of Patentability:

Applicants note that the amendments to claims 36 and 58 were not made for purposes of patentability, nor do those amendments narrow the scope of claim 36 or 58.

The meaning of "effect," when used as a verb as in claim 36, is to bring about. Applicants thus have not narrowed claim 36 but have simply replaced the term "effects" with its dictionary definition. No change in the scope of claim 36 is intended.

Similarly, as discussed below, Applicants do not believe—and did not intend—the words "securing" and "secured," as used in claim 58, to require that the interposer be immovable, and in fact, claim 58 expressly states that "said interposer is moveable." Thus, the amendment to claim 58 does not change the intended scope of the claim.

Applicants also note that claims 56 and 80 were also not amended for reasons of patentability but to use the term "dies" as the plural form of "die" consistently throughout the claims.

Rejection under 35 USC § 112, first and second paragraphs:

Claim 58 was rejected under 35 USC § 112, 1st and 2nd paragraphs as not being enabled by the specification and as unclear. Applicants respectfully traverse these rejections.

These rejections appear to be based on the premise that the word "secure" means immovably attached. Applicants disagree with such an interpretation of the word "secure," which is also inconsistent with the express language of claim 58 that states that the "means for securing" secures the interposer to the contact "such that at least one of said contactor or said interposer is moveable." Nevertheless, in the interest of advancing prosecution, Applicants have amended claim 58 to recite a "means for attaching," which should alleviate the Examiner's concerns about claim 58 and overcome the rejection under 35 USC § 112, 1st and 2nd paragraphs.

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Applicants note that one example, among others, of such an attaching means is the support 1020 shown in Figure 3a.

Rejections in view of prior art:

Claims 58, 60-74, 76-78, and 84-89 were rejected under 35 USC § 102 as anticipated by US Patent No. 5,974,662 to Eldridge et al. ("Eldridge '662"). Claims 58, 76-78, 80, 81, and 84-89 were also rejected under 35 USC § 102 as anticipated by US Patent No. 6,215,320 to Parrish ("Parrish"). In addition, claims 36, 39-57, and 75 were rejected under 35 USC § 103 as obvious in view of Eldridge '662 and US Patent No. 5,703,494 to Sano ("Sano"). Claims 37, 38, and 60 were rejected under 35 USC § 103 as obvious in view of Eldridge '662 and US Patent No. 6,184,053 to Eldridge et al. ("Eldridge '053"). Claims 49 and 50 were rejected under 35 USC § 103 as obvious in view of Eldridge '662 and US patent No. 6,064,213 to Khandros et al. ("Khandros"). Claims 42 and 63 were rejected under 35 USC § 103 as obvious in view of Eldridge '662 and Brozowski. Applicants respectfully traverse these rejections.

Turning first to independent claim 36, that claim is directed to a "test apparatus for testing an electronic device" comprising "a flexible contactor" and an "interposer." The combination of Eldridge '662 and Sano does not render claim 36 obvious for several reasons.

First, there is no motivation or suggestion to combine Eldridge '662 and Sano as those references were combined in the Office Action. The motivation asserted in the Office Action is the general statement in Eldridge '662 that several parameters affect "reliable pressure connections between the probe elements and the semiconductor die." Although several such parameters are listed, the flexibility of the probe card 502 is not listed as one of those parameters. (Eldridge col. 2, lines 6-10.) Therefore, the statement in Eldridge '662 relied on in the Office Action would not motivate replacing the probe card 502 with a flexible probe card.

Moreover, it is unclear how making the probe card 502 flexible would "assure sufficient and balanced electrical contact" between the probes 524 and the bond pads 526 of the wafer under test 508. Rather, making the probe card 502 flexible would most likely have the opposite effect. As described in Eldridge '662, electrical connections between the probes 524 and the bond pads 526 are formed by spring forces generated in the probes 524 as the bond pads 526 are pressed against (downward in Figure 5) the probes 524. Electrical connections between interconnection elements 516 and pads 520 and between interconnection elements 514 and

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terminals 510 are similarly created by spring forces generated in the interconnection elements 516, 514. (Eldridge '662 col. 23, line 26 through col. 25, line 29.) If the probe card 502 was replaced with a flexible substrate, these forces would cause the probe card 502 to flex downward (in Figure 5), weakening the spring forces in the probes 524 and interconnection elements 516, 514 and thus weakening the electrical connections between the probes 524 and the bond pads 526, the interconnection elements 516 and pads 520, and the interconnection elements 514 and terminals 510. Thus, far from assuring sufficient and balanced electrical contact, making probe card 502 flexible would likely weaken electrical contacts in the probe card assembly 500. Thus, while the claims of Eldridge '662 may encompass embodiments regardless of whether the probe card is flexible or not, the illustrative embodiments actually described and taught in Eldridge '662 do not utilize a flexible card and would not work effectively for their intended purpose—because of weakened electrical contact—if a flexible card was used in place of probe card 502.

Second, even if combined as described in the Office Action, Eldridge '662 and Sano do not meet all of the requirements of claim 36, which requires that "application of a pressure to said second surface of said contactor *brings about* electrical connections between ones of said first plurality of terminals on said contactor and ones of a second plurality of terminals on said electronic device." No such thing is disclosed or suggested in either Eldridge '662 or Sano.

In the Office Action, probe card 502 in Figure 5 of Eldridge '662 was equated with the contactor of claim 36. The second surface of the probe card 502 is therefore necessarily the bottom surface in Figure 5 (i.e., the surface opposite the surface on which terminals 510 are located). In Eldridge '662, however, pressure on the second surface of probe card 502 does not *bring about* electrical connections between the probe card terminals 510 and the wafer pads 526 (see Figure 5 of Eldridge '662) as would be necessary to meet the requirements of claim 36. Rather, in Eldridge '662, electrical connections with wafer 508 are brought about by moving the wafer 508 into contact with probes 524. (See Eldridge col. 27, lines 39-43.) Eldridge '662 says nothing about applying a pressure to the probe card 502 to "bring about" electrical connections with the wafer 508. (Applicants again note that the claims of Eldridge '662 may nevertheless be broad enough in scope to cover a full spectrum of embodiments including an embodiment in which pressure on probe card 502 "brings about" electrical connections with wafer 508 even though the illustrative embodiments actually described and taught in Eldridge '662 do not do so.) Sano likewise does not teach or suggestion bringing about electrical connections with wafer W

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by applying a pressure to contact assembly 40. Indeed, Sano also moves wafer W into contact with probes 42a. (See Sano Figure 3 and col. 3, lines 51-65.) Therefore, even if combined as suggested in the Office Action, Eldridge '662 and Sano do not meet the requirements of claim 36.

For all of the foregoing reasons, independent claim 36 is patentable over Eldridge '662 and Sano. Claims 37-57, 75, 79, and 80 depend from claim 36 and are therefore also patentable.

Claims

Independent claim 58 includes:

"means for attaching said interposer to said contactor such that at least one of said contactor or said interposer is moveable between a first position and a second position while said interposer is attached to said contactor,
wherein in said first position, said first plurality of contact elements do not contact said first terminals on said contactor, and
in said second position, said first plurality of contact elements contact said first terminals on said contactor and said first plurality of contact elements and said second plurality of contact elements provide electrical connections from said first terminals on said contactor to a second plurality of terminals on said electronic device."

The Office Action does not identify any disclosure in Eldridge '662 as meeting the above-quoted features of claim 58. Indeed, Eldridge '662 does not teach or suggest such a "means for attaching." With respect to Parrish, the Office Action identifies without explanation Parrish's three point planarizer 34 as meeting the above quoted requirements of claim 58. There is no teaching, however, in Parrish that describes the three point planarizer 34 as performing the above-quoted functions of the "means for attaching" element of claim 58. Claim 58 is therefore patentable over Eldridge '662 and Parrish. Claims 60-74, 76, 77, 81, and 83 depend from claim 58 and are therefore also patentable.

Independent claim 84 is directed to a "test apparatus" that includes "a first substrate" and "an interposer substrate." A "first plurality of elongate, resilient contact elements" and "a second plurality of elongate, resilient contact elements" extend from first and second surfaces of the interposer substrate, and "application of a pressure directly to said first substrate causes ones of said second plurality of elongate, resilient contact elements to contact corresponding ones of said contact points on said electronic device to be tested." As discussed above, Eldridge '662 does not teach or suggest that application of a pressure to the probe card 502 causes contact with the

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wafer 508 being tested. Parrish similarly does not teach or suggest that application of a pressure to probe card 30 causes contact with wafer 26. Indeed, nowhere does Parrish teach or suggest any mechanism or means for applying pressure directly to probe card 30 (which was equated with the first substrate of claim 84 in the Office Action). Eldridge '662 and Parrish thus do not teach or suggest "wherein application of a pressure directly to said first substrate *causes* . . . contact . . . [with] said electronic device to be tested." Claim 84 is therefore patentable over Eldridge '662 and Parrish.

Claims 85-89 depend from claim 84 and are therefore also patentable.

For all of the foregoing reasons, the rejection of the claims under 35 USC §§ 102 and 103 should be withdrawn.

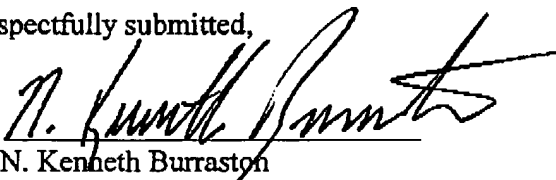
Conclusion:

In view of the foregoing, Applicants submit that all of the claims patentably distinguish over the prior art. Therefore, the rejections of the claims should be withdrawn and the application passed to allowance. If the Examiner believes that a discussion with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 323-5934.

Respectfully submitted,

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